

CLAIMS:

1. A printing apparatus for exposing an image onto a photosensitive medium, comprising:
 - 5 (a) a printhead comprising a linear array of exposure sources, each said exposure source operable at a variable intensity;
 - (b) a shuttle for moving the printhead over the photosensitive medium in a reciprocating motion between one end of a carriage assembly and the other;
 - 10 (c) an encoder coupled to the shuttle mechanism for providing an index signal at each of a plurality of incremental positions of the shuttle mechanism along the carriage assembly; and
 - (d) exposure control logic for calculating a shuttle velocity according to index signal timing and for adjusting the variable intensity of each
15 said exposure source according to said shuttle velocity.
2. A printing apparatus as in claim 1 wherein said array is a linear array.
- 20 3. A printing apparatus as in claim 1 wherein said array of exposure sources comprises an LED array.
4. A printing apparatus as in claim 1 wherein said shuttle mechanism comprises a belt pulley.
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5. A printing apparatus as in claim 1 wherein said encoder is an encoder strip.
6. A printing apparatus as in claim 1 wherein said
30 photosensitive medium moves in a stepwise fashion between printing cycles.

7. A printing apparatus as in claim 1 wherein said photosensitive medium is motionless during each printing cycle.

8. A printing apparatus as in claim 1 wherein the same
5 adjustment is made to the intensity of each of said exposure sources.

9. A printing apparatus as in claim 1 wherein said linear array of exposure sources is comprised of red, green, and blue light sources.

10. A method of printing by exposing an image onto a photosensitive medium, comprising:

(a) providing a printhead comprising a linear array of exposure sources, wherein each exposure source operates at a variable intensity, and wherein said printhead is coupled to a shuttle mechanism;

15 (b) moving said shuttle mechanism and said printhead over said photosensitive medium in a reciprocating motion between a first end of a carriage assembly and a second end of said carriage assembly;

(c) providing an index signal at each of a plurality of increments of position of the shuttle mechanism along the carriage assembly;

20 (d) calculating a shuttle velocity timing said index signal;
and

(e) adjusting said variable intensity of each said exposure source according to said shuttle velocity.

25 11. A method for modulating exposure energy from exposure sources moved in a scan direction across a width of a photosensitive substrate comprising the steps of:

(a) measuring a changing velocity of said exposure sources by obtaining a series of encoder signals, wherein each signal corresponds to a
30 position along said scan direction;

(b) deriving a full scale correction factor for said changing velocity;

(c) multiplying said full scale correction factor to said predetermined target exposure intensity; and

(d) correcting said exposure errors due to said changing velocity, resulting in uniform exposure density across a width of said
5 photosensitive substrate.

12. A method for modulating exposure energy from exposure sources moved in a scan direction across a width of a photosensitive substrate comprising the steps of:

10 (a) measuring a changing velocity of said exposure sources by obtaining a series of encoder signals, wherein each signal corresponds to a position along said scan direction;

(b) deriving a fractional correction factor, offset from a constant nominal value for said changing velocity;

15 (c) calculating a correction factor by adding said derived fractional correction factor to a constant value representative of said nominal value for said changing velocity;

(d) multiplying said calculated correction factor to said predetermined target exposure intensity; and

20 (e) correcting said exposure errors due to said changing velocity, resulting in uniform exposure density across a width of said photosensitive substrate.

13. A printing apparatus for exposing an image onto a
25 photosensitive medium, comprising:

(a) a printhead comprising a linear array of exposure sources, each said exposure source operable at a variable intensity;

(b) a shuttle for moving the printhead over the photosensitive medium in a reciprocating motion between one end of a carriage
30 assembly and the other;

(c) an encoder coupled to the shuttle mechanism for providing an index signal at each of a plurality of incremental positions of the shuttle mechanism along the carriage assembly;

- (d) exposure control logic for calculating a shuttle velocity according to index signal timing and for adjusting the variable intensity of each said exposure source according to said shuttle velocity; and
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(e) wherein said photosensitive medium in a stepwise fashion between printing cycles.